

ABSTRACT

An Interdigital Bulk Acoustic-Wave Transducer (IBAT) device is provided with pairs of exciting electrode fingers disposed sufficiently close together on the piezoelectric substrate and dielectric coating over the exciting electrode fingers to generate an IC-compatible voltage at relatively high electric field strength, resulting in a reduced region of excitation and uniform electric field strength distribution. The IBAT advantageously produces a lateral electric field substantially uniform over a substantial portion of the active BAW structure area, reducing, or virtually eliminating sharp voltage spikes, an electrical field produced by the low voltages resident on integrated circuit (IC) chips, usually of a magnitude of 10 volts, or lower, the planar electrode structure being compatible with IC processing techniques, such as photolithography and the BAWs produced thereby being essentially plane waves, with propagation away from, but with phase progression substantially parallel to, the substrate surface. Numerous IBAT structural arrangements are possible by advantageously over-coating the IBAT electrode finger stripes with an insulating dielectric in different configurations, and any possible configuration achieved through over-coating is considered to be within the contemplation of the devices and methods of the present invention. Interdigital bulk acoustic wave transducers and methods for exciting bulk acoustic waves with interdigital electrode fingers are also provided.